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Remarks on the *Spermophagus rufipes* species group, with the description of a new species from Iran (Coleoptera: Chrysomelidae: Bruchinae: Amblycerinae)

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ABSTRACT. *Spermophagus shamszadehi*, a new species reared from seeds of *Convolvulus fruticosus* and *C. humilis* from the Yazd Province in Central Iran is described. A key to members of the *Spermophagus rufipes* species group is also proposed. *Spermophagus arcis* DELOBEL, 2011 from Syria is synonymized with *Spermophagus lukjanovitschi* SAVITSKY, 2000.

Key words: entomology, taxonomy, *Convolvulus*, Coleoptera, Chrysomelidae, Bruchinae, *Spermophagus shamszadehi*.

The *Spermophagus rufipes* species group was defined by ANTON (1996) for *Euspermophagus rufipes* TER-MINASSIAN, 1975 described from Mongolia and *S. borowieci* ANTON, 1996 from Pakistan. A major characteristic of these two species, justifying their inclusion in a specific group, is the presence of a 'bispinose sclerite' (BOROWIEC 1991) in the central area of the internal sac. A similar structure exists in a few African species (*S. humilis* DECELLE, 1970 and *S. maurus* FAHRAEUS, 1871), but these belong to different groups.

Spermophagus turanicus (LUKJANOVITCH & TER-MINASSIAN, 1957) described from Kazakhstan and *S. caricus* DECELLE, 1982 (from Turkey) also belong to the *rufipes* species group. As independently reported by ANTON (1998) and SAVITSKY (2000), the holotype of *S. turanicus* is a female. After examining the genitalia of the single type, the two authors published conflicting opinions on the relationship between *turanicus* and *caricus*: while Anton synonymized the two species, Savitsky stressed their mor-

phological differences. Dorsal vestiture of the type of *B. turanicus* is described by ANTON as 'destroyed', and 'indistinct or missing' by SAVITSKY. Considering that the type is a female without elytral vestiture, it is impossible at the moment to decide of the true identity of *S. turanicus*. In doing so, we follow BOROWIEC (1991), who treated *S. turanicus* as a species with 'uncertain taxonomical position' because the type was unknown to him.

During the course of a large-scale study of Iranian forests and rangelands, including taxonomy and biology of seed predators, a new species of *Spermophagus* closely related with *S. rufipes* group members was observed. Specimens were reared from seeds of two *Convolvulus* species in the Central Iranian province of Yazd. Specimens were preserved in 70% ethanol until study, the genitalia were dissected and cleared in a 10% solution of potassium hydrochloride and mounted in water-soluble DMHF (dimethyl hydantoin formaldehyde). Photographs were taken through a microscope, and drawings were performed with a vector graphics editing software using photographs as templates. Abbreviation used: MNHN, Muséum national d'Histoire naturelle, Paris.

***Spermophagus shamszadehi* sp. nov.**

TYPE MATERIAL

Holotype: Male, "IRAN, Yazd prov., Khatam, ex *Convolvulus fruticosus*; M. Shams-Zadeh; 07.vi.2011", "*Spermophagus shamszadehi* n.sp., Delobel & Sadhegi des. 2013", dissected, genitalia on cardboard, MNHN. Paratypes, 1 male, Yazd Prov., ex *Convolvulus fruticosus*, L. Abbaszadeh leg. (Delobel 04113), 1 male, Yazd, ex *Convolvulus evolvuloides*, L. Abbaszadeh leg. (Delobel 01411), 2 females, same data as holotype, one dissected (Delobel 04513), MNHN.

DESCRIPTION

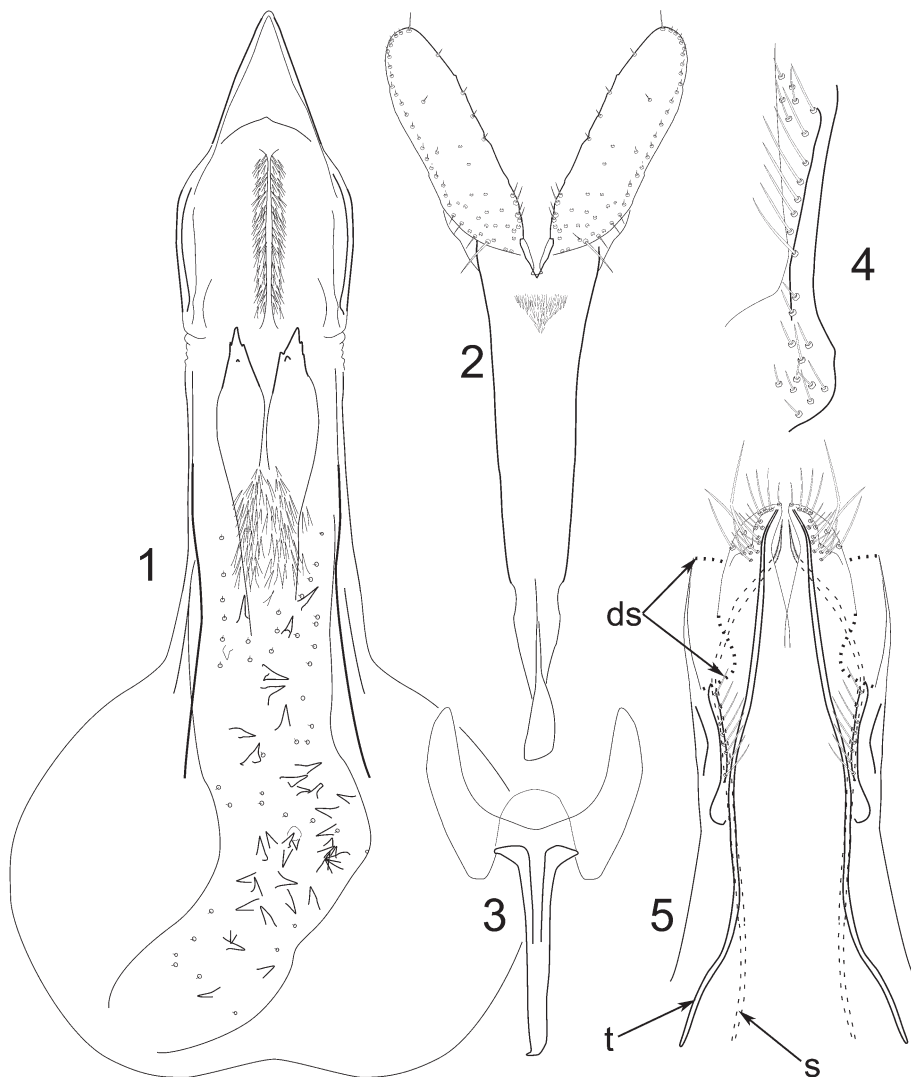
Length: 2.0-2.2 mm; width: 1.4-1.6 mm.

Body black, except two basal antennal segments (segments 3 to 5 sometimes progressively darkened) testaceous, four anterior legs from extreme apex of femur reddish, with tarsi and tibiae sometimes darkened in part. Metatibial spines dark reddish-brown. Dorsal vestiture thin and moderately dense, imperfectly hiding underlying structures, yellowish grey and/or whitish grey, with sometimes brownish, faintly defined areas; elytral setation homogeneous or yellowish with faint indication of a whitish pattern (specially base, interstriae 3 and 5, a preapical tranverse band, a lateral spot before middle of elytra between striae 7 and 9); last visible tergite yellowish-grey to ash grey; ventral vestiture thin, light greyish to white.

Male. Head short, eyes moderately bulging, maximum head width about 1.2 times width behind eyes; separated by 0.15 times head width including eyes; face wide, distance between posterior rim of eyes and apex of clypeus / distance between eyes = 3.8; ocular sinus about 2/3 length of eye, width at bottom of sinus composed of 6-7 ommatidia; frontal carina well defined, thin. Punctuation of face very dense, small, apex of clypeus straight, slightly thickened. Antenna long, measuring 0.8 times body length; antennal segments 1-3 sub-moniliform, 4 slightly widened apically, 5-10 of increasing

length, 10 more than twice longer than wide, 11 apically pointed ($L/W = 3.4$). Length of antennomeres: 2.4: 1; 2.0; 2.3; 2.7; 3.1; 3.6; 4.1; 4.5; 4.4; 5.9.

Pronotum moderately transverse ($W/L = 1.6$), broadly semi-circular. Disc alutaceous, with thin scattered punctures. Elytra distinctly wider than pronotal base, 1.1 times longer than combined width, their sides convex; striae on disc thin and sharp; interstriae flat, with thin punctuation on alutaceous background. Hind tibia short, with apical spines subequal, slightly arcuate.



1-5. *Spermophagus shamszadehi*: 1 – median lobe; 2 – lateral lobes; 3 – speculum gastrale; 4 – inner comb of ovipositor; 5 – diagrammatic representation of ovipositor in dorsal view (t: longitudinal apodeme of tergite IX, s: longitudinal apodeme of sternite IX, ds: position of the curved dorsal suture)

Abdomen with ventrite 5 strongly emarginated. Last visible abdominal tergite broad, 1.5 times wider than long, with apex convex, slightly turned under.

Genitalia: Median lobe (Fig. 1) moderately long, maximum width excluding basal hood / total length = 0.17, almost parallel-sided but apically broadened, basal hood emarginated apically; ventral valve large, moderately sclerotized, acutely triangular; dorsal valve of similar shape. Internal sac with a strand of short needles in anterior third, followed by a pair of large sclerites strongly sclerotized, apically dented, not fused; saccus basally with a batch of short needles, then 35 isolated sclerotized spines and numerous sensilla. Lateral lobes (Fig. 2) moderately long, almost parallel-sided, rounded apically, surface with well visible reticulate sculpture, outer margin with numerous minute setae, and a few longer ones basally, inner margin with 5-6 setae near base and a few minute ones along rest of margin. Basal plate regularly widened distally, with a small keel proximally. Spiculum gastrale modified (Fig. 3).

Female. Similar to male, with antennae shorter. Ovipositor (Fig. 5) without ring-shaped pigmentation, inner comb regularly curved (Fig. 4), bearing 11 long and strong setae, its widened base with about 10 smaller setae, and widened apex with about 5 long setae. Apical lobes of genital plate acute apically, without lamina at apex. Longitudinal apodeme of sternite IX not reaching apex of gonopodes.

ETYMOLOGY

The species is dedicated to the collector of the holotype, Mehdi Shams-Zadeh, who works with the Agricultural and Natural Resource Research Centre of the Yazd Province.

HOST PLANTS

Larvae develop in the seeds of *Convolvulus fruticosus* PALLAS and *Convolvulus humilis* JACQ. (= *C. evolvuloides* BOISS. = *C. undulatus* CAV.) (Convolvulaceae). Both species are typical of xerophytic habitats. *C. fruticosus* is a shrubby, cushion-shaped species found in Central Asia, from Iran to South Siberia and Western China, *C. humilis* is a Mediterranean and Middle East species common in dry and desert areas from Spain to Saudi Arabia and Iran.

DISCUSSION

The assignment of the new species to the *rufipes* group is primarily based on the presence of a well-defined, strongly sclerotized apically bispinose sclerite in the central part of the inner sac. Leg color distinguishes it from both *S. caricus* and *S. turanicus sensu* SAVITSKY, whereas *S. rufipes* and *S. borowieci* have partly reddish legs, like the new species.

In addition to leg color, the new species differs from *caricus sensu* DECELLE (1982) and BOROWIEC (1991) in the lack of striking elytral markings and in details of male genital morphology: median lobe longer, ventral valve with concave sides (convex in *caricus*), distal part of internal sac with a few scattered pointed sclerites (densely lined with small spicules becoming medium-sized teeth with circular base in *caricus*), lateral lobes of moderate length, broadly rounded apically (longer, with acuminate apex in

caricus), basal plate subtriangular, wider distally (parallel-sided or wider basally, with sclerotized sides in *caricus*).

S. turanicus sensu SAVITSKY has a smaller, completely fused bispinose sclerite, followed by densely packed spicules, lateral lobes tapered from base to apex, basal plate almost parallel-sided, not widened apically. Concerning ovipositor morphology (Fig. 5), a comparison can be made with SAVITSKY's drawing of *S. turanicus* (Fig. 4 p. 352): inner comb regularly curved (straight in *turanicus*), comprising 11 long and strong setae, with widened base bearing about 10 smaller setae, and widened apex with about 5 long setae (absent in *turanicus*); apical lobes of genital plate acute apically (obtusely broad in *turanicus*), without lamina at apex (a semi-circular lamina in *turanicus*): longitudinal apodemes of sternite IX ('accessory supporting sclerite' of SAVITSKY) not extending beyond apex of gonopodes. SAVITSKY erroneously figured their distal points as extensions of the longitudinal apodemes of tergite IX; they reach beyond level of gonopode apex in *turanicus*.

S. borowieci is characterized by its elytral vestiture not covering body surface, uniformly greyish, internal sac without sclerites beyond bispinose sclerite, but instead with small, densely packed spicules, lateral lobes elongated, with about 50 setae on outer margin (ANTON 1996). Some specimens from Iran however differ from typical form from Pakistan in elytral vestiture dense, completely concealing integument, not uniformly greyish, with variously striking areas of dark and light setation, similar to *S. caricus*.

S. rufipes from Mongolia has posterior legs partly reddish, antennae short, extending barely to basal fourth of elytra, claws without basal tooth, bispinose sclerite small, elongate, without any sclerite beyond it, lateral lobes strongly narrowed in distal half, with about 13 long setae on outer margin.

DISTRIBUTION

All specimens were bred from seeds collected in the province of Yazd, central Iran.

CONCLUSION

The new taxon closely resembles *S. caricus* and *S. rufipes*, but we consider that differences explained above amply justify its description as a valid species. We bear in mind that a completely different understanding of the group would be legitimate, with *caricus* and *turanicus* treated as synonyms (see ANTON 1998, 2010), and possibly also the three species with reddish legs, all merged into a large, highly variable species. As a first step towards solving this indecision, an effort should be made in the future to second morphological studies with more complete biological data, and when possible with molecular data. Unfortunately, at the moment the only species in the group with a known larval diet is *S. shamszadehi*. Even though the *Spermophagus rufipes* species group remains poorly known, a simplified key to taxa presently included is proposed below, with a view to help clarify their status.

1. All legs black (at most, apex of anterior and median femora narrowly reddish) 2.
- At least fore and middle legs in greater part reddish 3.
2. Elytra with striking yellow, white and/or brown markings (Syria, Iran) *caricus* DECELLE
- Elytral vestiture uniform or with at most a few faint lighter markings (Kirghizistan) *turanicus* L. & T.-M. *sensu* SAVITSKY
3. Posterior legs partly reddish (Mongolia) *rufipes* TER-MINASSIAN
- Posterior legs entirely black 4.
4. Distal part of internal sac densely lined with small spicules, lateral lobes strongly elongated (Pakistan, Iran) *borowieci* ANTON
- Distal part of internal sac with a limited number of strong spines, lateral lobes short (Iran) *shamszadehi* n. sp.

We take this opportunity to indicate that *Spermophagus arcis* DELOBEL, 2011 from Syria is a junior synonym of *Spermophagus lukjanovitschi* SAVITSKY, 2000, **syn. nov.** *S. lukjanovitschi* apparently does not belong to the Iranian fauna.

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